

## PATENT COOPERATION TREATY

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## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PL70077PC00	<b>FOR FURTHER ACTION</b> See Form PCT/PEA/416	
International application No. PCT/SE2004/001375	International filing date (day/month/year) 24.09.2004	Priority date (day/month/year) 01.10.2003
International Patent Classification (IPC) or national classification and IPC G01N21/896		
Applicant SICK IVP AB et al		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 3 sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input checked="" type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input checked="" type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand  03.03.2005	Date of completion of this report  04.01.2006	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer  Stuebner, B  Telephone No. +49 89 2399-2179



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**Box No. I Basis of the report**

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1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

**Description, Pages**

1-10 as originally filed

**Claims, Numbers**

1-16 filed with telefax on 15.08.2005

**Drawings, Sheets**

1/7-7/7 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing *(specify):*
  - ☐ any table(s) related to sequence listing *(specify):*
4. ☒ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☒ the claims, Nos. 1,11
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing *(specify):*
  - ☐ any table(s) related to sequence listing *(specify):*

\* If item 4 applies, some or all of these sheets may be marked "superseded."

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**Box No. II Priority**

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1. ☒ This report has been established as if no priority had been claimed due to the failure to furnish within the prescribed time limit the requested:
- ☒ copy of the earlier application whose priority has been claimed (Rule 66.7(a)).
  - ☐ translation of the earlier application whose priority has been claimed (Rule 66.7(b)).
2. ☐ This report has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rule 64.1). Thus for the purposes of this report, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-16
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-16
Industrial applicability (IA)	Yes: Claims	1-16
	No: Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

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**Box No. VII Certain defects in the international application**

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The following defects in the form or contents of the international application have been noted:

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item I**

**Basis of the report**

The amendments filed with fax dated 15.08.2005 go beyond the disclosure of the international application as filed (articles 19 (2) and 34 (2b) PCT); see especially independent Claims 1 and 11:

**A) Claim 1:**

1. Neither "a first area (7)" nor an "at least one second area of the object (2)" is explicitly disclosed in the original application; see II.6-8.  
Disclosed is only "a line of light (7)" (see p.7, l.23) and "light scattered in regions B1 and B2" (see p.7, l.28).
2. Furthermore, it is not disclosed that "at least one second area is located at a predetermined distance from the first area (7)".  
Additionally, this predetermination of a distance is totally vague.
3. It is only disclosed that the system is arranged "to detect defects on the object (2)"; see e.g. original Claim 1.  
No disclosure can be found that defects e.g. in the "second (2b) layer of the object (2)" are detected.

**B) Claim 11:**

For method Claim 11 corresponding objections apply.

Therefore, Claims 1 and 11 filed with letter dated are examined.

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

1. The following documents (D) are referred to in this report; document D1 was not cited in the international search report:

D1: US-A- 5416594

- D2: PATENT ABSTRACTS OF JAPAN vol. 2002, no. 02 & JP 2001 305072 A  
(ADVANTEST CORP, NIWANA MICHIO) 02 April 2002  
D3: PATENT ABSTRACTS OF JAPAN vol. 2003, no. 12 & JP 2003 247952 A  
(RICOH CO LTD) 05 December 2003  
D4: US-A-5 334 844

2. In D1 (see e.g. col.1, l.62 to col.3, l.11; Cl.13; Fig.1, 2) a system is described comprising all features corresponding to the preamble of apparatus Claim 1. It should be noted that the "imaging sensor" is implicitly disclosed in D1; see e.g. col.3, ll.5-9; col.7, ll.20-30.

Furthermore, in D1 (see above citations) is disclosed that the system comprises means being suitable for obtaining information on light scattered in the first layer and the second layer of the object from the representation and, means for comparing the information to stored information in order to detect defects on the object.

It should be noted that according to D1 it is not explicitly disclosed to obtain "information on light scattered in the first layer..".

However, the skilled person having the object to measure defects in the first and/ or second layer (see also the objects of D2 or D3) would use the apparatus according to D1 also for this purpose without having to change the hardware of this known apparatus.

The subject-matter of Claim 1 therefore does not involve an inventive step.

For similar reasons also independent method Claim 11 does not involve an inventive step.

A new independent method claim clearly defining the measurement of reflected and scattered light in two layers of an object in order to detect defects on the surface of the object and/ or of the geometric profile of the object or its layers may be regarded to involve an inventive step with regard to the cited documents.

3. In Claims 2-10 and 12-16 only slight (constructional) changes are defined which come within the scope of the customary practice followed by persons skilled in the art (see also the documents cited in the Search Report), especially as the advantages thus achieved can readily be foreseen.  
Consequently, at present these dependent claims do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step.

**Re Item VII**

**Certain defects in the international application**

If, in spite of the above-mentioned objections, the applicant wishes to proceed further in the regional phase, the following additional points should be noted, i.e. the corresponding amendments provided:

Documents D1 to D4 should be mentioned and their contents briefly commented on in the introductory part of the description.

The introductory part of the description should contain statements agreeing with any independent claim submitted.

If new features are taken into the claims, Article 19 (2) of the PCT should not be infringed and it would probably accelerate the examining process if it were indicated from which part of the application any such features are taken.

**Re Item VIII**

**Certain observations on the international application**

From Figures 5b, 5c, 7b and 7c and the corresponding description the following is unclear:  
What are the parameters along the (horizontal) x-axis? Why is there only one peak B in

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(SEPARATE SHEET)**

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Figures 5c and 7c? Why is the main peak B not located in correspondence with the location of defect 8? Is in Figures 5b and 7b the "reflected light A" a reference line with regard to curves B1 and B2 and why are the curves B1 and B2 symmetric to the line of light A and/ or is there a third dimension involved?

**CLAIMS**

1. A measuring system (1) for detecting defects of an object (2) having at least a first (2a) and a second (2b) layer, which system (1) comprises at least one light source (3) arranged to illuminate the object (2) with incident light (4), **characterised in that** the system further comprises

5 - an imaging sensor (6) arranged to detect light (5a, 5b) from the object (2) which partly is reflected (5b) from a first area (7) of the object (2) where the incident light (4) hits the object (2) and partly is scattered in the object (2) and leaves (5a) the object (2) in at least one second area of the object (2) wherein the at least one second area is located at a pre-determined distance from the first area (7) and, to convert the detected light (5a, 5b) into electrical charges;

10 - means for creating a representation (A, B, C) of the object (2) according to the electrical charges; and,

15 - means for comparing the created representation (A, B, C) of the object (2) to stored information in order to detect defects on the at least first (2a) and second (2b) layer of the object (2).

2. A measuring system according to claim 1, **characterised in that** the measuring system (1) and/or the object (2) is/are arranged to move in relation to one another in a predefined direction of movement.

20 3. A measuring system according to claim 1, **characterised in that** the incident light (4) is arranged to have limited dispersion in a predefined direction.

25 4. A measuring system according to claim 3, **characterised in that** the incident light (4) is a linear light.

5. A measuring system according to claim 1, **characterised in that** the system further comprises means for obtaining information on the geometric profile of the object (2) from the representation (C).

30 6. A measuring system according to claim 5, **characterised in that** the system comprises means for obtaining information on the geometric profile of the first layer (2a) of the object (2) from the representation (C).



7. A measuring system according to claim 5, **characterised in that** the system comprises means for obtaining information on the geometric profile of the second layer (2b) of the object (2) from the representation (C).
- 5 8. A measuring system according to claim 1, **characterised in that** the light source (3) comprises a polarizer arranged to facilitate the distinction between light reflected on the object (2) and scattered light in the object (2).
9. A measuring system according to claim 1, **characterised in that** the first layer  
10 (2a) consist of a transparent or semi-transparent material.
10. A measuring system according to claim 1, **characterised in that** the object (2) is a package wrapped in a protective material.
- 15 11. A method for detecting defects of an object having at least a first and a second layer by means of a measuring system, in which method the object is illuminated by means of incident light, **characterised in that** the method comprises the steps of:
  - detecting by means of an imaging sensor light from the object which partly is  
20 reflected (5b) from a first area (7) of the object (2) where the incident light (4) hits the object (2) and partly is scattered in the object (2) and leaves (5a) the object (2) in at least one second area of the object (2) wherein the at least one second area is located at a pre-determined distance from the first area (7);
  - converting the detected light into electrical charges;
  - 25 - creating a representation (A, B, C) of the object according to the electrical charges;
  - comparing the created representation (A, B, C) of the object (2) to stored information in order to detect defects on the at least first (2a) and second (2b) layer of the object (2).
- 30 12. A method according to claim 11, **characterised in that** the measuring system and/or the object is/are moved in relation to one another in a predefined direction of movement.
- 35 13. A method according to claim 11, **characterised in that** also information on the geometric profile of the object is obtained from the representation (C).

14. A method according to claim 13, **characterised in that** information on the geometric profile of the first layer of the object is obtained from the representation (C).
- 5 15. A method according to claim 13, **characterised in that** information on the geometric profile of the second layer of the object is obtained from the representation (C).
- 10 16. A method according to claim 11, **characterised in that** the incident light is polarized and that the polarized incident light is used to distinguish between reflected light on the object and scattered light in the object.